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NATURAL HISTORY

THE OCEANS

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BIRD BANDING BY MAUNSELL S. CROSBY

The oceans unite all shores and bring the world more closely together. The expeditions of the American Museum have ranged over many seas and have enjoyed the aid and hospitality of maritime nations from the poles to the equator. To all of these the appreciation of the Museum is hereby extended.

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THE NORTHERN ELEPHANT SEAL GROUP, AMERICAN MUSEUM

This photograph shows the dominant elements in the group made possible through the generosity of Mr. Arthur Curtiss James. The bull with head raised was mounted by Mr. Frederick Blaschke; the other specimens by Mr. Clyde L. Patch. The background was painted by Mr. Albert Operti from the photograph of the seal rookery shown on page 572. The "Albatross" may be seen faintly just to the left of the rocky promontory

The Northern Elephant Seal and the Guadalupe Fur Seal

By CHARLES HASKINS TOWNSEND
Director of the New York Aquarium

THERE are two species of seals native to the west coast of North America that in the past were harassed with reckless disregard of their possible extinction: the northern elephant seal (*Mirounga angustirostris*) and the Guadalupe fur seal (*Arctocephalus townsendi*). The former, as the result of freedom from molestation during recent years, is at present slowly increasing in numbers; the latter may be extinct, as it has not been seen since 1894, when several seals were killed for their pelts.

The fur seal is known to science only from the weatherworn skulls obtained by the writer at Guadalupe Island in May, 1892.[1] Of the few fur seals seen afloat at that time not one was secured, and none was seen on land during a prolonged examination of their former haunts, although a search was made of all the beach caves around the island.

There is a possibility, however, that stragglers of this species still exist, as the habit of this seal of lying in caves serves to keep it out of sight. Our hunt through the numerous caves of Guadalupe Island in May was futile, doubtless because it was made in advance of the breeding season, which occurs in June and July. We looked for the animal again in March, 1911, during the expedition of the "Albatross,"[2] but did not examine the caves, believing it useless to do so at that time of year. Any further search should be made late in July, before the young take to the water, and should include all the caves along the water line. The hope that, if still surviving, it may reestablish itself, is reënforced by the fact that Guadalupe Island is now a guarded reservation. This valuable seal formerly inhabited the islands of Lower California and those of California northward as far as the latitude of San Francisco. In 1892 the writer secured from men who had participated in sealing at Guadalupe and the San Benito islands certain records which, supplemented by researches he made subsequently at San Diego, indicate that 5575 fur seals were taken between 1876 and 1894.

To the records of fur seals known to have been killed by sealers at Guadalupe, San Benito, and Cedros (Cerros) islands, may be added figures which the writer found recently in the third edition of William Mariner's account of the Tonga Islands, published in London in 1827.[3] Mr. Mariner was on board the British whaler "Port-au-Prince," which took 8338 fur-seal skins at Cedros, San Benito, and Guadalupe islands, between August 1 and September 19, 1806. Another record is that of the ship "Dromio" of Boston in 1807, which at "Shelvock's Island," alleged to be southwest of Cape San Lucas in latitude 21°, "in a fortnight killed 3000 fur seals." Belcher (1837)

[1] Townsend, C. H. 1899. "Pelagic Sealing." Extract from *The Fur Seals and Fur-Seal Islands of the North Pacific Ocean*, Part III, pp. 223–74.

[2] This old ship, after a long and eventful career, has recently passed into private ownership. Its record of service is commemorated in a Note contributed to this issue by Doctor Townsend (p. 619).

[3] Mariner, W. 1827. *An Account of the Natives of the Tonga Islands, in the South Pacific Ocean.*

THE "ALBATROSS" DREDGING AT SEA

The dredging boom may be seen out to starbord; the port boom is rigged for surface towing. The "Albatross," after nearly four decades in the service of the government, in the course of which she participated in a number of important scientific expeditions, recently passed into private ownership. (See Note on p. 619 of this issue)

and others failed to find "Shelvock's Island" in the position described. It may have been Guadalupe Island, farther to the north, but whatever its identity, in this region the species taken must have been the Guadalupe fur seal. While the scattered records of the long-continued hunting of the Guadalupe seal account for large numbers, Mariner's statement and the record of the "Dromio," so long overlooked, seem to indicate that the species may have been much more abundant than has hitherto been supposed. There is further reason for this inference in the fact that the islands where the species—of the same genus as the Antarctic species—developed, remained unexploited until whaling in North Pacific waters began late in the eighteenth century. Dr. E. C. Starks[1] has shown conclusively that the great numbers of fur seals killed on the Farallon Islands, off the coast of California, during the earlier years of the nineteenth century were of this species.

While the very existence of the Guadalupe fur seal is in doubt, the preservation of the elephant seal seems assured. As a result of representations made to the Mexican government after the re-discovery of this seal in March, 1911, by the "Albatross" Expedition and again by the joint American and Mexican party of biologists[2] that visited the island in the Mexican patrol boat "Tecate" in July, 1922, Guadalupe Island was made a reservation and provided with a resident guard.

The expedition of the "Tecate" found 264 elephant seals at Guadalupe —more than twice the number counted by the writer in 1911—and from a study of the old and young estimated the size of the herd, present and absent, at about 1000 animals.[3]

The casual reappearance of the elephant seal at other islands, from Cedros northward to the Santa Barbara Islands, may reasonably be expected. As the protection now afforded by the Mexican government is limited to Guadalupe Island, the animal may not find very safe quarters when it extends its present range. It is, therefore, desirable that precautions be taken to insure the safety of such stragglers as may appear among islands of the Santa Barbara group, where in the absence of restrictions it is liable to molestation by fishermen. The elephant seal should be given the fullest opportunity to return to its ancient haunts north of the boundary. It is not only commercially valuable but also inoffensive and of great scientific interest.

The ancestors of the northern elephant seal, like those of its associate in habitat, the Guadalupe fur seal, wandered from Antarctic waters and successfully ventured across the equatorial barrier in times sufficiently remote to have enabled their descendants to acquire new characters in a strange environment. The account of the northern elephant seal, published by Scammon[4] in 1874, continued for many years to be the main source of information respecting the creature. Only a few immature specimens were to be found in museums, and naturalists assumed that t had become extinct. Much more is known about the Antarctic species.

[1]Starks, E. C. 1922. "Records of the Capture of Fur Seals on Land in California," *California Fish and Game*, Vol. VIII, pp. 15 –60.

[2]Hanna, G. Dallas, and Anthony, A. W. 1923. "A Cruise Among Desert Islands," *National Geographic Magazine*, Vol. XLIV, No. 1, pp. 71–99.

[3]For an account of the status of the herd in 1923 the reader is referred to the article by Mr. Huey in this issue.

[4]Scammon, Charles M. 1874. "The Sea Elephant," *The Marine Mammals of the North-Western Coast of North America*, pp. 115–23.

The discovery of a small herd at San Cristobal Bay, Lower California, in 1880, created an immediate revival of sealing, which resulted in the killing of more than three hundred animals during the next four years. These facts were reported to the National Museum in 1884 by the writer, who thereupon was sent at once in a chartered vessel, the schooner "Laura," in search of specimens. Sixteen seals—all that were found during a cruise of two months—were taken for scientific purposes, as the only alternative to their slaughter by sealers.[1]

The elephant seal was then lost sight of for nearly a decade. In 1892 a small band was found at Guadalupe Island by the writer while in search of fur seals under the direction of the Department of State. Some of these elephant seals were secured and the identity of the fur seal—the object of the expedition—was established.

From 1892 information respecting the elephant seal was lacking, so far as biologists were aware, until 1907, when Guadalupe Island, long uninhabited, was visited by Charles Harris in the interest of the Rothschild Museum.[2] There about forty of the animals were found.

The next important event in this history of the northern elephant seal was the visit of the "Albatross" to Guadalupe Island in 1911. Thanks to the generosity of Mr. Arthur Curtiss James, of New York, the American Museum of Natural History had the privilege of coöperating in this expedition, as a result of which the Museum obtained its splendid habitat group of these huge animals. Much descriptive and pictorial material, previously lacking, was also secured. The numerous photographs were, indeed, the only ones of the elephant seal that had until then been taken, with the exception of a few made by Harris in 1907 at the same island. Six young elephant seals captured by this expedition were exhibited at the New York Aquarium, where some of them lived nearly two years. These are now preserved as specimens in the American Museum, the United States National Museum, and the Brooklyn Museum.

In 1922 the expedition of the "Tecate" to Guadalupe took place, to be followed a year later by a second visit of this ship to the island.

Having given this brief summary of recent expeditions concerned with the elephant seal, let us cast our eye back over some of the earlier narratives. In Mariner's account referred to above, it is stated that the "Port-au-Prince" was proceeding to "the island of Ceros" (Cedros) for the purpose of "laying in a cargo of elephant oil and seal-skins" but the account contains no further reference to the elephant seal which, it is known, was abundant there at that time (1806).

Scammon,[3] in writing of the animal life at Cedros Island, says, "Seals and sea-elephants once basked upon the shores of this isolated spot in vast numbers, and in years past its surrounding shores teemed with sealers, seal elephant, and sea-otter hunters. . . . But those innumerable herds of sea-elephants have long since been nearly exterminated, and here seals likewise are found only in comparatively small numbers."

Scammon states that the elephant

[1] Townsend, C. H. 1885. "An Account of Recent Captures of the California Sea Elephant and Statistics Relating to the Present Abundance of the Species." *Proc. U. S. N. M.*, pp. 90–4.

[2] Rothschild, Hon. Walter, Ph.D. 1908. "Mirounga angustirostris (Gill)," *Novitates Zoologicæ*, Vol. XV, p. 393.

[3] Scammon, C. M. 1869. "Report of Captain C. M. Scammon, of the U. S. Revenue Service, on the West Coast of Lower California." Appendix, pp. 123–31, of *Resources of the Pacific Slope*, by J. Ross Browne.

seals come to shore at certain seasons of the year to shed their coats and to give birth to their young. He tells of the method of hunting: how the seals ashore were driven farther landward by men advancing from the water to slaughter them. Their number in the days of which he speaks was great enough to give "full cargoes to the oil-ships." The smaller animals were killed by clubbing, the large males by shooting. There is considerable evidence that the former abundance of the elephant seal in the Lower California region has not been overestimated.

Many whalers and sealers frequented the shores and islands of Lower California between 1808 and 1840 under American, British, French, and Russian flags, and it is known that the elephant seal was much hunted for a few years after the discovery of gold in California and that, as a consequence, it became scarce.

Except for some recent observations by members of the "Tecate" expeditions,[1] the natural history of the northern elephant seal apparently is recorded only in the writings of Scammon[2] and the reports of the "Albatross"[3] expedition. Rothschild's remarks on the specimens collected by Harris are limited to a single page. Scammon's descriptions deal largely with the Antarctic elephant-seal fishery.

The northern elephant seal is the largest of all seals, with the possible exception of the Antarctic species, an extremely large specimen of the former measuring, according to Scammon, twenty-four feet in length. The same author refers to one twenty-two feet long which yielded 210 gallons of oil. The three large males taken by the "Albatross" Expedition at Guadalupe Island in 1911 were each sixteen feet in length. During the past half-century the northern species has had little chance of attaining large size. Under the protection now afforded, it is possible that *monsters* twenty feet or more in length may reappear at Guadalupe Island. The writer found the blubber of the three males mentioned to be four inches thick about the fore part of the body. Cleveland says that the fat of the Antarctic species, taken by him at Kerguelen Island, was seven inches thick and that the largest specimen might yield as much as 245 gallons of oil, while Murphy[4] indicates a maximum of about eight inches for the blubber. As the oil is superior to whale oil for lubricating purposes, there can be no doubt about the great value of the elephant seal as an oil producer.

Few large animals are so indifferent to the presence of man as these great seals. They showed little inclination to move as members of the "Albatross" Expedition walked among them. When intentionally disturbed, they soon quieted down, often throwing sand on their backs with their flippers and completely ignoring our presence. Even when roughly prodded and forced into the sea, they usually returned promptly. While in the water, they were equally unconcerned about the coming and going of the ship's boats. A common attitude in the water, especially with those of smaller size, is to float with only the nose and hind flippers above the surface.

Getting out of the water is difficult

[1] Hanna, G. Dallas, and Anthony, A. W. 1923. "A Cruise Among Desert Islands." *National Geographic Magazine*, Vol. XLIV, No. 1, pp. 71–99. Also Anthony, A. W. 1924. "Notes on the Present Status of the Northern Elephant Seal, Mirounga Angustirostris," *Journal of Mammalogy*, Vol. V, No. 3, pp. 145–52.

[2] Scammon, Charles M. 1874. "The Sea Elephant," *The Marine Mammals of the North-Western Coast of North America*, pp. 115–23.

[3] Townsend, C. H. 1912. "The Northern Elephant Seal." *Zoologica*, Vol. I, No. 8, pp. 159–73.

[4] Murphy, R. C. 1918. "The Status of Sealing in the Sub-Antarctic Atlantic." *The Scientific Monthly*, August, 1918.

View of the northern end of the elephant seal rookery on Guadalupe Island.—Males, females, two-year-olds, and yearlings are lying about on the beach. The two males in the middle distance with heads erected are in fighting attitude, the proboscis being retracted and the mouth wide open. In the distance is seen the "Albatross." This photograph suggested the background for the Elephant Seal Group shown on p. 566

The old males are usually sleepy and disinclined to move unless forcibly disturbed

Adult male and female elephant seals.—The male assumes a threatening attitude only when deliberately aroused

The calloused surface in front is the result of fighting.—This part of the body is often deeply scarred and unsightly

for such heavy-bodied and short-limbed animals. In passing through the shallow water the hind flippers are raised and spread to take advantage of the pushing effect of the low waves.

When the creatures are on the dry beach, progress is still slower, but under crowded conditions individuals have actually crawled inland several hundred yards. In moving up the beach the animal arches its back and, rising on the fore flippers, draws the hind quarters forward. Its progress is interrupted by frequent pauses.

During the mating season the large males engage in considerable fighting, especially those accompanying females. When within striking distance of each other, they rise as high as possible on the fore limbs, draw the flabby proboscis into folds on top of the head, which is held aloft, and strike quick blows at each other's necks and shoulders with their large canines. The attacks are accompanied by considerable nasal and vocal noise. The animals of fighting age and size bear the marks of many previous encounters, the skin of the neck and breast being rough, calloused, and hairless as a result of the punishment received from adversaries.

The fighter makes little attempt to protect his fore quarters, which seem to serve as a shield for receiving blows; but he is careful to strike quickly and withdraw his precious nose out of harm's way. There is apparently no actual seizing and tearing of the skin, the offensive blow being a quick bite with the large canines. The combatants soon separate; there is none of the prolonged tussling and fierce scrimmaging indulged in by male fur seals, which often leave them with gaping wounds. A fur-seal fight is of the dog-fight sort.

The proboscis of the elephant seal, relaxed and pendent when the animal is crawling, or lying in a flabby mass when the animal is at rest, is capable of many muscular expressions when the seal is awake and moving about. It may be withdrawn and wrinkled up in various positions on the head, or if the head be thrown back completely, may hang relaxed toward the rear.

The proboscis is only slightly developed in the half-grown males, suggesting that it does not become fully developed until sexual maturity is reached. In the females the proboscis is lacking. Anatomical study of the proboscis is desirable, as there is uncertainty whether it really can be "inflated." During the skinning operations of the "Albatross" Expedition no inflatable air sacs, or chambers, were noted, but it is possible that such may have been overlooked.

The very young elephant seal is black and is so excessively fat as to be almost helpless. The yearling is grayish brown in color, and is about four feet in length. None of the six yearlings brought to the New York Aquarium was more than five feet long. In weight they varied from 167 to 301 pounds, the males being heavier than the females. Their capture was effected by simply rolling them separately in nets and lifting them into the boats. They showed no inclination to bite when on the beach, on the deck of the "Albatross," or during their life at the Aquarium, although when approached, they would assume a threatening attitude by opening the mouth very widely.

Nothing very definite is known regarding the feeding habits of this seal. In the stomachs of those killed at various times the writer found nothing but a little sand. It is stated in some of

The bulky object on the beach in front of the boat is a young seal rolled up in a net to render it helpless. Thus secured, it was rowed to the "Albatross" and with five of its fellows started on the long journey to New York

Yearling elephant seals in the pen especially constructed for them on the deck of the "Albatross"

SIX YEARLING ELEPHANT SEALS IN THE NEW YORK AQUARIUM
The greater number of them lived for nearly two years after taking up their abode in the institution at Battery Park

the accounts of the Antarctic species that seaweed and the remains of squid have been noted in the stomachs of these seals. Murphy found, in addition to squid, the remains of small fish in the stomachs of animals killed as soon as they had come to shore.[1] Harris observed "tiny sardines not more than two inches long" in his Guadalupe specimens. Anthony[2] alludes to the capture of a young male, three-quarters grown, "which had recently bolted a bass of about two pounds weight." He adds that "a few fragments of kelp, taken perhaps at the same time as the fish, and a few pebbles were the only stomach contents." The yearlings brought to the Aquarium ate nothing but fresh fish. Usually this food was given them cut into pieces, but they preferred the live fish that were occasionally supplied. The daily ration for each of the seals was six or seven pounds of smelt, tomcods, roach, and cod. They ignored absolutely squid, live crabs, and seaweed. Unlike most seals, they crushed their food before swallowing it, often turning on their backs in the water during the process of mastication. They would take the food from the hands of their keeper with no signs of fear.

In swimming about the large pool the fore flippers seldom came into action, the hind flippers being employed much as a fish uses its tail. These young elephant seals often slept under water, stretched out on the floor of the pool.

It is possible that the elephant seal is more active at night than by day. It may be that it feeds only at night, which would account for the lack of evidence as to the food of those killed in the daytime. Its eyes are suggestive of those of nocturnal animals, being remarkably large, dark, and lustrous.

Although the elephant seal apparently does not wander far from shore, like the fur seal and some other species, it has at least one enemy in the shark. A specimen secured by the writer at San Cristobal Bay was disfigured by a gash on the rump in which were the marks of a shark's teeth. Sealers told the writer that fully one fourth of the smaller animals captured there bore such marks.

The total number of elephant seals killed during the past forty years at San Cristobal Bay and Guadalupe Island—the only places they were known to frequent during that period—appears to have been 454. Since 1884 none has been found at San Cristobal.

Comparison of the large skulls secured in 1911 at Guadalupe with those of the Antarctic species has shown the distinctness of the northern species. This is also apparent when the excellent photographs now available of living animals of both species are compared.

Naturalists have not seen enough of the northern elephant seal to determine whether it is polygamous to the extent of the southern species. It is evident that much remains to be ascertained in regard to this interesting mammal before its complete life history can be written.

[1] Murphy, R. C. 1914. "Notes on the Sea Elephant, *Mirounga leonina* (Linné)." *Bulletin, Amer. Mus. Nat. Hist.*, Vol. XXXIII, pp. 63–79.

[2] Anthony, A. W. 1924. "Notes on the Present Status of the Northern Elephant Seal." *Journal of Mammalogy*, Vol. V, No. 3, pp. 145–52.

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